stone strata. The rocks on being broken open are found to contain crystals of a white and a pinkish mineral, and numerous patches of sphalerite with small particles of pyrite. The associated rock is a gray, siliceous limestone, readily attacked by dilute acids. The minerals occur in radiated masses of thin bladed crystals and in veins of a centimeter or less in thickness, which divide the rock into irregular polyhedrons. The sphalerite is dark brown with yellow streaks, and has the ordinary resinous luster.

There seem to be two distinct minerals in the veins. One of them occurs in opaque pink crystals, and often in masses of irregular shape. These crystals decrepitate readily, and give both the barium and strontium flames. The streak is white, and there is slight effervescence with acid. An approximate analysis gives barium sulphate, 80 per cent.; strontium sulphate, 14 per cent.; with small quantities of silica and iron and calcium carbonate. This corresponds quite closely in composition to the so-called celesto-barite of von Waltershausen.

The second mineral when carefully picked appeared quite different. It occurs in transparent colorless crystals, varying in shape from flat rhombic to needle-shaped prismatic. In some places they are colored by red oxide of iron, which was removed as completely as possible. It decrepitates and gives a distinct strontium and a faint barium flame. Approximate analysis gives strontium sulphate, 96 per cent.; barium sulphate, 1 per cent.; with small quantities of silica and calcium carbonate, and shows it to be celestite.

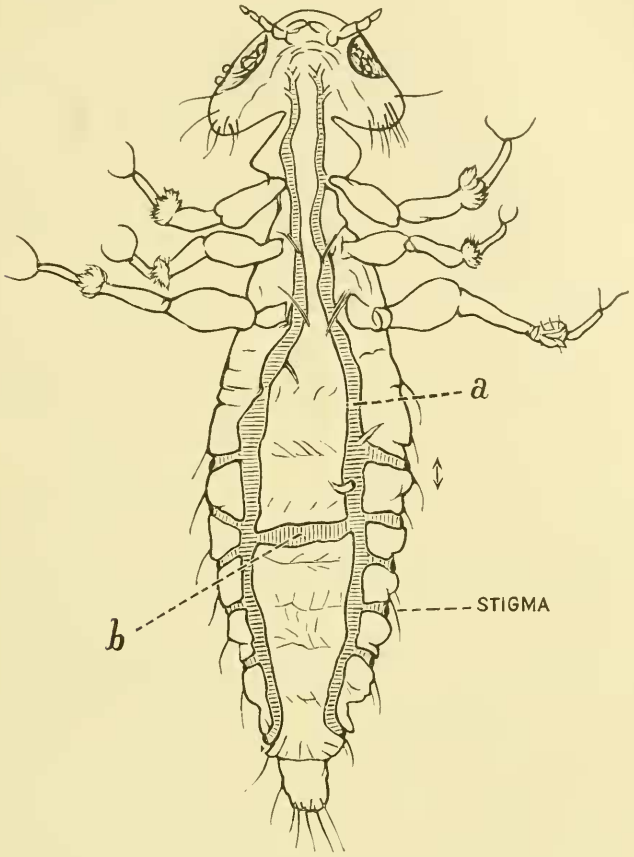
SOME NOTES ON THE MALLOPHAGA.

BY VERNON L. KELLOGG, LAWRENCE, KANSAS.

The Mallophaga (bird-lice) have been little studied. Nitzsch, and more recently Grosse, both of Germany, have devoted attention to the classification and to the anatomy of these insects. In the United States practically no work has been done in reference to them. As to anatomy, Grosse's "*Beitrage zur Kenntniss der Mallophagen*" may be considered the best authority, and as to classification, the scheme of Nitzsch is accepted. The Mallophaga have no well-defined position in the insect world. Packard in his latest publications arranges them with the white ants and stone-flies, making the order Platyptera.

The writer has noted and described, with full microscopic measurements, twenty-four species representing ten genera taken from Kansas birds. As no list of American species has been made, the specimens are arranged by genera and given species numbers. The writer discovers among these specimens types of two new genera which he introduces into Nitzsch's classification, and has fully described. Also are noted certain points which are essential to the classification of the Mallophaga and which are, with some hesitation, introduced into Nitzsch's scheme. Well-defined relations between certain families and genera of Mallophaga and certain orders and families of Aves are apparent, the distribution of the insects being evidently affected by the characteristic habits of the hosts. A series of forty specimens of Mallophaga, mounted on glass slides serves to exhibit external differences among the species so far observed. Observations on the anatomy, gross and minute, have been made to a limited extent, Dr. Grosse's monograph being very complete. Notes on the respiratory system of Tetropthalmus, as shown by accompanying cut of a clarified specimen have been made. Notes on alimentary canal content, upholding the declarations of Grosse that the Mallophaga eat feathers alone, and blood only indirectly, *i. e.*, when on the feathers by reason of a wound or mange, have been made. In observation of the digestive system in Docophorus, it is noted that the anus is a long

slit or line opening by the spreading apart of two lips, the excreta being ejected as a small pellet. Little observation of the young of the Mallophaga seems to have been made. The nymphs are very light colored, unchitinized specimens, and ex-



TETROPTHALMUS.—Showing respiratory system

a. Longitudinal tracheal trunk. *b*. Transverse tracheal trunk.

hibit large, unwieldy heads. From the notes on over fifty specimens measured, it may be said that the Mallophaga vary in length from less than one millimeter to five millimeters. In the following scheme of Nitzsch the points added by the writer are printed in italics. The table is slightly rearranged:

THE MALLOPHAGA.

With one (1) clawed feet—found only on mammals.

With thread-like antennæ—three jointed; no maxillary palpi.....Trichodectes.

With club-shaped antennæ—four jointed; with maxillary palpi.....Gyropus.

With two (2) clawed feet—found only on birds.

Philopteridæ.

With threadlike antennæ—five jointed; no maxillary palpi; *one (1) pair of simple eyes; one (1) jointed tarsus, blunt and rounded.*

Trabeculæ movable; feelers in both sexes, for the most part, without difference.

Head broad; abdomen short, elliptical; labrum generally with transparent projection ..... Docophorus.

Head somewhat elongated; abdomen long, with nearly parallel sides; no transparent labral projection ... *Nov. Gen.*

Trabeculæ immovable.

Feelers thread-like, with sexual difference.

Hind head rounded—the male end segment rounded, Nirmus.

Hind head sharp cornered; abdominal segments blended in the middle ..... Goniocotes.

Male feelers pincerlite, because of a branch on the third segment.

Hind head cornered; female end segment, warty; male end segment, rounded ..... Goniodes.

Hind head, rounded; male segment, notched ..... Lipeurus.

Liotheidæ.

With club-shaped, four-segmented antennæ; with maxillary=*labial* palpi; *with two (2) pairs of simple eyes; with lengthened, two-jointed tarsus.*

Without meso-thorax; feelers always concealed.

Head very broad, without orbital depression ..... Eureum.

Head broad, with orbital depression, with greatly-developed ligula ..... *Nov. Gen.*

Head elongated, with temple corners extending backward.

With sharply-cut-off clypeus, and shallow orbital depression ..... Læmobothrium.

With only rounded sides of head, and long, side flaps on labrum ..... Physostomum.

With meso-thorax.

Meso-thorax large, sharply defined; head three-sided; feelers concealed ..... Trinotum.

Meso-thorax small, only perceptible.

Orbital depression deep; feelers mostly stretched out forward ..... Colpocephalum.

Orbital depression very slight or lacking; feelers concealed ..... Menopon.

*Tetropthalmus.

The writer will gladly receive notes of inquiry or of interest in connection with the bird lice, and especially will be glad to receive specimens of lice taken from Kansas birds. Lice can be killed by immersion in dilute alcohol, and then taken out and sent, wrapped in paper, in common envelope.

*Tetropthalmus belongs, according to Nitzsch's classification, to Menopon; but Grosse decides it to be a new genus, and calls it Tetropthalmus on account of its four eyes, two pairs; but these four eyes are present in all Liotheidæ, so this is not at all a generic characteristic. However, on Grosse's authority it is introduced as a genus, and as it has not before been placed in the scheme the writer gives it its relative position in the classification.